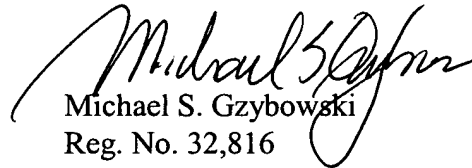


•• REMARKS/ARGUMENTS ••

By the Present Preliminary Amendment corrects matters of grammar, sentence structure, syntax, form in the specification and claims without changing the scope of the disclosure or adding any new matter thereto.

Entry of the present Preliminary Amendment prior to the examination of the present application is respectfully requested.

Respectfully submitted,

  
Michael S. Gzybowski  
Reg. No. 32,816

BUTZEL LONG  
350 South Main Street  
Suite 300  
Ann Arbor, Michigan 48104  
(734) 995-3110

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## Substitute Specification Marked-Up Copy

## Electric vehicle

## Technical field

~~This~~ The present invention relates to ~~a type of~~ electric vehicles and more particularly relates to vehicle, especially a mini-type four-wheel electric vehicles. ~~vehicle.~~

## Background of the Invention

Nowadays, mini electric ~~vehicle is~~ vehicles are widely used and popular for features such as their being easy to drive and environmentally friendly. ~~its feature of easy driving and environmental protection.~~ In many areas, since the aged ~~or the disable~~ and disable people have difficulty ~~are difficult in~~ driving, walking or using public transportation, ~~traffic tools,~~ electric ~~vehicle has~~ vehicles usually become their first choice of transportation. ~~choice.~~ In addition, the electric ~~vehicle~~ vehicles can also be used in ~~individual~~ pedestrian traffic, traffic in industrial & and commercial settings ~~fields~~ as well as in sport activities ~~sports fields~~ such as transportation on the traffic in golf courses, ~~course~~ etc. The structure of current mini electric ~~vehicle~~ vehicles normally places the battery under the passenger seat. Since this type of vehicle is driven by the rear wheel, and its motor and driving device are also installed under the passenger seat. This configuration result in the vehicle having a ~~caused the heavy rear weight.~~ ~~of the vehicle.~~ In some occasions especially when climbing ~~mountain or slope,~~ mountains or slopes this type of mini electric vehicle may turnover backward and cause injury to the passenger. In order to avoid ~~this,~~ this type of accident some electric vehicles have ~~vehicle has to install~~ anti-turnover wheels installed ~~wheel at the rear.~~ rear portions thereof. ~~This caused~~ Such measures increase the cost and make the structure more complex. ~~increase and complex structure.~~

Furthermore, since the weight distribution is seriously unbalanced ~~not balanced,~~ and the ~~handlebar is~~ handlebars are light, the steering balance is not easy to control. Therefore, the steering and driving performance ~~for~~ of current electric vehicles is unsatisfactory. ~~vehicle are not satisfied.~~ If ~~the~~ a suspension device is used, since the front weight is light, the spring force is ~~smaller,~~ the small and the damping of the suspension ~~device~~ is not realized. ~~obvious.~~

~~Someone had ever~~ Some have put the battery on the steering shaft to increase the front weight and ~~reach the balance~~ the weight between for the front and rear. However, since ~~the~~ this increases the load on the steering shaft, ~~is increased,~~ the steering is becomes difficult and the center of gravity is raised ~~while the~~ so that safety is reduced. Hence, ~~the effect~~ this approach is also not good.

### Summary of the Invention

The ~~purpose of this present~~ invention is ~~to provide~~ provides an electric vehicle ~~with in~~ which the battery is placed at the front so as to ~~reach the balance of the~~ weight distribution and improve the safety and driving performance of the vehicle. ~~performance.~~

The ~~other purpose of this present~~ invention is ~~to provide~~ further provides an electric vehicle ~~with~~ that has good suspension damping performance and ~~improve~~ improved the driving comfort.

~~The third purpose of this~~ The present invention is ~~to provide~~ further provides an electric vehicle ~~with~~ that has good steering performance, including improved ~~and improve the~~ control, ~~of steering,~~ flexibility and smoothness.

~~The electric vehicle is~~ Generally, electric vehicles are limited by storage and transportation space. ~~While~~ When the battery is placed at the ~~front,~~ front of the electric vehicle according to the present invention it is ~~required not only not necessary~~ to increase the length and weight of the ~~vehicle, but also~~ vehicle and to avoid occupying the space where the driver would normally place puts his or her feet. Hence, according to the present invention, the structure of the frame and front wheel suspension of the device ~~shall be~~ is improved at the same time.

The ~~idea~~ concept of ~~this the present~~ invention is: is to design the front end of the frame is ~~designed~~ as a forward protruding casing ~~for placing in which~~ the battery can be placed while designing the suspension of the device ~~is designed~~ as front convex & and rear concave ~~shape~~ shapes that are covered on the frame casing. In this way, the length of the electric vehicle is not

increased ~~by including without~~ any additional parts ~~and the increased.~~ The space at the front is also fully used since the battery is placed at the front.

The electric vehicle ~~of the present invention comprises invented includes:~~ a frame, a seat, a two front wheels, two rear wheels, a driving device, a battery, a steering system and a front wheel suspension device. The middle ~~& and rear part parts~~ of the frame, seat, rear wheel and the driving device are the same as similar conventional components. ~~ones.~~ ~~Its~~ Accordingly, a detailed description ~~of these conventional components~~ is omitted ~~in the present description.~~ ~~here.~~

~~The improvement of~~ According to the present invention is: ~~The~~ the middle position of the front end of the frame protrudes forward ~~and includes~~ a casing, on which the battery is placed.

The front wheel suspension device ~~appears~~ front has a front convex & and a rear concave ~~concave~~ shape covering the front end of ~~that the~~ casing. ~~Pivot~~ A pivot joint is provided exists at the middle of the front end of the ~~casing;~~ casing and two front wheels are installed on the front wheel suspension device. The rear edge line of the two front wheels is located at the rear of the battery front ~~edge.~~ edge;

The steering system is connected to the front end of the frame and interlocks with the front ~~wheels.~~ wheel.

The middle of the front end of the casing is provided with two upper/lower projecting ~~upper/lower~~ connection parts, on which two pairs of upper/lower pivot joints with reverse setting are ~~provided.~~ set.

The front wheel suspension device includes a pair of front upper ~~cantilevers;~~ cantilevers, a pair of front lower ~~cantilevers~~ cantilevers and a vibration ~~damper;~~ the damper. The front ends of the front upper ~~& and lower cantilevers~~ cantilevers ~~along the axis of electric vehicle length direction~~ are connected to the pivot joint parts along the axis of electric vehicle length direction, respectively. The rear ends of the ~~cantilevers~~ cantilevers extend towards the ~~side rear to the side~~ of the frame casing, ~~appearing~~ forming two similar upper/lower ~~trapezoid;~~ trapezoids. The two left ~~& and front cantilevers~~ cantilevers and the two right ~~& front cantilevers~~ cantilevers are

connected separately with left ~~& and~~ right ball head ~~pin pins~~ at the rear; rear. On the left ~~& and~~ right head pins are left ~~& and~~ right axles which are used to fix the left ~~& and~~ right front wheels; wheels. ~~The two~~ Two dampers are ~~set~~ provided near the rear end of the ~~cantalever, cantilever,~~ with one end thereof connected to the frame while the other end thereof is connected to the cantilever.

The steering system ~~consists of~~ includes left ~~& and~~ right lateral bars, a steering shaft and a steering handle; the handle. The steering shaft can be ~~set~~ provided at the front end of the frame so as to move rotationally and ~~interlocks~~ interlock with the above axles via lateral bars.

In order to improve the firmness of the suspension device, two pairs of upper/lower rear ~~cantalevers~~ cantilevers are additionally provided on the suspension device, which cantilevers are basically parallel to the front edge of the frame and form the bottom line of ~~the trapezoid;~~ trapezoids, wherein one end thereof is connected to the pivot joint parts while the other end thereof is fixed near the rear end of the front cantilevers. ~~cantalever.~~

Stands for steering shaft installation are ~~set~~ provided on the upper/lower connection parts, respectively. ~~Ball~~ A ball bearing is installed on the stand for free turning of the steering shaft.

The steering shaft has a forward protruding part between the upper ~~& and~~ lower stands ~~for~~ turning which provides a turning connection of lateral bars.

The lateral bars are ball head link bars.

The front end of the upper/lower connection part is supported with an I-shaped steel ~~bracket. I-steel.~~

The casing has downward concave cavity for receiving a battery therein. ~~placing battery.~~

This invention ~~adopts~~ provides the abovementioned ~~improved~~ structure of front frame and suspension device. The battery is moved to the front on the premise of not increasing electric vehicle length. Thus, ~~it realized the balance~~ the battery placement balances the front to rear of ~~front/rear weight~~ distribution. Since the center of gravity of the electric vehicle is at the middle, the driving stability ~~has been~~ is improved, especially in when climbing slope ~~while it won't~~

slopes so that the vehicle will not tilt backward even if no anti-tilting wheels are installed. In addition, the installation position of the battery is relatively low ~~comparatively lower~~, which makes the center of gravity of the vehicle lower so that safe ~~the safety~~ driving can be realized.

~~Again, after increasing~~ Increasing the weight at ~~of~~ the front ~~part~~ of the electric ~~vehicle~~, vehicle allows the front wheel suspension device to bear ~~bears~~ more force. This ~~can give~~ provides full play to ~~it's the~~ suspension damping ~~function~~ and ~~improve~~ improves the driving comfort. Furthermore, ~~after~~ because the weight of the front of the vehicle is increased, ~~part~~ increases, the friction of ~~front/rear~~ wheels is balanced, ~~especially in turning while~~ balanced which increases the friction of the front wheel during turning. ~~increases~~. In this way, the steering and control performance of the electric vehicle ~~has been~~ is improved.

Finally, this invention provides with ~~enough~~ sufficient room for placing more batteries and ~~increases~~ thereby increasing the power reserve for the electric vehicle so that the driving ~~distance~~ range can be increased. ~~farther~~.

#### Brief Description of Drawings ~~Description of the figures attached.~~

~~Fig.~~ Figure 1 is ~~the~~ a structural schematic drawing ~~for an embodiment of this~~ an ~~invented~~ electric vehicle according to one embodiment of the present invention. ~~vehicle.~~

~~Fig.~~ Figure 2 is ~~the~~ a structural schematic drawing ~~for an embodiment of the frame front of this~~ an electric vehicle according to one embodiment of the present invention. ~~vehicle.~~

~~Fig.~~ Figure 3 is ~~the~~ a structural schematic drawing ~~for an embodiment of frame front, suspension device and part of the steering system of this~~ invented electric vehicle according to one embodiment of the present invention. ~~vehicle.~~

~~Fig.~~ Figure 4 is a structural schematic drawing of the embodiment of the invention shown in Fig. 3 as viewed from bottom.

## Best Mode for Carrying out the Invention ~~Description of the Embodiment~~

The following is ~~the~~ a detailed description of a specific implementation example ~~on~~ of the ~~this invention via~~ presented in reference to the attached figures.

~~Fig.~~ Figure 1 is a four-wheel mini electric vehicle for one ~~person, comprising person~~ which comprises a frame 1, a seat 2, two front wheels 3, two rear wheels 4, a driving device 5, a battery, a steering system 6 and a front wheel suspension device 7. ~~The middle/rear part middle~~ and rear portions/parts of the vehicle can be of conventional design and therefore have ~~has not been reformed. Hence, no detailed description of these portions/parts is included herein. below is for it.~~

~~See~~ As shown in Fig. 2, the front of the frame 1 is basically a plane frame ~~structure,~~ structure of which the middle position includes a protruding forward a casing ~~11;~~ 11. The two concave positions of the casing 11 are used for fixing front wheels. Thus, the front width of the ~~wagon didn't increase. vehicle is not increased.~~ The size of the casing 11 is ~~designed~~ configured to ~~suit~~ be suitable for placing the battery, matched ~~with~~ to the electric vehicle, in a protruding way out of the frame ~~body;~~ body. ~~Also, a little~~ In addition, a small recess can be provided in ~~into~~ the frame ~~can be done~~ based on the size of the ~~battery;~~ battery. The casing can be ~~in one plane~~ coplanar with the frame, ~~can also be made into a~~ or the battery receiving portion can be made concave 13 to lower the center of gravity of the electric vehicle and make the height of that the battery ~~protruding~~ protrudes out of the frame less. When the driver is very tall, the two sides of the battery can be used for the driver to place his or her feet on. ~~feet.~~

In order to improve the strength of the front of the casing 11, two beams can be provided ~~set~~ at the ~~front;~~ front. If the ~~material's~~ material strength is ~~enough,~~ sufficient, one beam can also be used. ~~accepted;~~ At the middle of the beam are two upper/lower connection parts 12 for connecting cantilevers ~~cantilever~~ and a steering shaft. The two connection parts 12 protrude

forward from casing 11, which 11 and are fixed to each other with an I-shaped I steel bracket 14 at the front end. At the upper/lower connection parts 12 are two pairs of front/rear pivot joints 121, 122, 123, 124, 121', 122', 123', 124' with reverse setting which provide for pivot-joining of the cantilevers cantilever, respectively. Also provided on the upper/lower connection parts 12, are steering shaft stand stands 64 and 65 that include a are set with steering bearing installed for free and smooth rotation of steering shaft 63.

As can be seen from Fig.3, Fig 3 the front wheel suspension device 7 consists of includes a pair of front upper cantilevers cantilevers 71, 72, a pair of front /lower cantilevers front/lower cantilevers 73, 74, and a vibration damper 79 at both right and left, left sides. The front ends of the upper/lower cantilevers cantilevers 71, 72, 73, and 74 are connected to the pivot joints 121', 122', 123', and 124' along the axis of the electric vehicle in the length direction. The rear end of the cantilevers cantilevers extend towards their side rear to the side of the frame casing; casing as shown. The left front cantilevers cantilevers 71, 73 and right front cantilevers cantilevers 72, 74 are connected at the rear end are connected to left/right ball head pins 75, 76 respectively; respectively. On the left/right ball head pins 75, 76 are left/right left/right axles 77, 78 for fixing the left/right front wheel 3; 3. Vibration damper 79 is set provided near the rear end of the cantilever, cantilevers with one end thereof connected to a beam 111 of the frame 11 while and the other end thereof connected to the lower cantilevers cantilever near the rear end of the lower cantilevers as shown. cantilever; The way of connection is conventional way for the vibration damper.

In order to improve the firmness of the suspension device, a pair of the rear & and upper cantilevers cantilevers 71', 72' and a pair of the rear & and lower cantilevers cantilevers 73', 74' are set provided which are substantially basically parallel to front edge of casing 11. 11; one ends One end of each of the rear cantilevers cantilevers are connected to pivot joint joints 121', 122', 123', 124', respectively, while the other ends thereof are fixed near the rear end of the front cantilevers cantilevers 71, 72, 73, and 74. Thus, the front and rear cantilevers cantilevers have



formed ~~form~~ two ~~upper/ lower~~ upper/lower triangle or trapezoid shaped structures ~~structure~~ covering the front end of the casing ~~11; 11~~. The bevel edge angle of the triangle or trapezoid shaped structures can be determined based on the size of the electric vehicle. The ~~better~~ preferred angles range from ~~angle ranges at~~ 40°-50°. With this structure, on the premise of not increasing the length of the electric vehicle, sufficient ~~the room for battery is provided. has been sufficient.~~ The front ~~wheel~~ wheels 3 fixed on ~~axle~~ axles 77 and 78 ~~lies~~ lie in the concave position of the side of the casing 11. Hence, the width of the front part of the vehicle is not increased. ~~didn't increase.~~ In addition, the rear edge of the two front wheels 3 ~~locates~~ coincides with at the rear of the front edge of the battery.

Battery The battery is placed on the frame 11. When the electric vehicle is driven, ~~driven on the way~~, bumping is transferred to the axle via the front wheels and ~~then then~~, transferred to cantilevers ~~cantalevers~~ via ball head pins. After damping by the vibration damper 79 connected to the cantilevers, ~~cantalever~~, as a result of the increase in the front weight ~~increase~~ of the electric vehicle, the force transferred to the frame ~~won't~~ does not cause great vibration ~~for to be~~ transferred along the front frame. Thus, the damping effect of the suspension device ~~has been~~ is improved.

~~See Fig.4. The~~ As shown in Fig. 4, the steering system 6 ~~consists of~~ includes left/right lateral bars 61, 62, a steering shaft 63 and a steering handle 66. Lateral bars 61, 62 are ball head link bars, with one ~~ends~~ end each thereof rotationally connected on ball head pin 75, 76 ~~rotationally~~ while the other ends rotationally connected on steering shaft 63, ~~rotationally~~. A forward protruding part 631 of the steering shaft 63 ~~is set~~ extends between installation stands ~~stand~~ 64 and 65, on which left/right lateral bars 61, 62, are co-axially connected. Thus, when the steering shaft turns, the lateral bar drives the ball head ~~pin pins~~ to turn so as to ~~realize~~ interlock ~~between~~ the axle 77, 78 and the steering shaft 63. Since this steering system ~~has support from~~ is supported by ball bearings, it turns smoothly. ~~bearing, its turning is smooth.~~ The turning of the front wheels ~~wheel's turning~~ is driven via lateral bars. The structure is simple and the turning is

free. The trapezoid ~~bevel~~ beveled edge of the suspension device makes the turning range of the front wheel tighter. ~~broader~~.